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## DISTRICT HEATING PRACTICES IN EUROPE

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We appreciate this opportunity of bringing to you some of the information we were able to secure concerning district heating developments in Europe. We feel that it is one of the obligations of manufacturers in any particular field, to study not only what is being done in their line of industry at home but in other countries where such developments can produce advances in the art, and such advantages and improvements can be employed to the benefit of the home industry.

In order to keep abreast of district heating developments in other countries and to be able to apply at home the lessons learned by others abroad, we sent one of our engineers to Europe, and during the past winter he has visited most of the larger heating plants in France, Germany, Denmark and Czechoslovakia.

District heating is a relatively new utility service in Europe, the oldest and largest plant being in Barmen, Germany, the first section of which was installed in 1920, just twelve years ago. The following year, Hamburg, Germany, saw its first heating installation. Since that time, a large number of plants have been installed in European cities, most of them small, and a few of them fairly large. Located in Hamburg, Germany, is the firm of Rudolph-Otto-Meyer, which engineering and construction firm designs and installs district heating systems. Under the capable and energetic leadership of Mr. Margolis this firm has done considerable in the development of district heating in Europe. Mr. Margolis is popularly referred to over there as the Father of District Heating in Europe. Many of you no doubt will remember Mr. Margolis from his visits to the utility companies in this country a few years ago.

The Rudolph-Otto-Meyer Company was very cordial and extremely helpful. They assisted us tremendously by giving us information concerning European practices; they gave us letters of introduction to their managers and altogether were just as nice as they could be. Incidentally we found in Europe just as we find here that the men in district heating are the finest chaps you will meet and I don't mean to be complimentary, particularly to individuals but I mean they are so interested in their work that they just want to help you get information that is going to be helpful to others.

We found that same condition in Europe, and it certainly exists here. They entertained our representative, they took him to every corner of their plant that he might find something of interest, gave him

written reports on all of the questions he asked, and we were greatly indebted by the way, to so many of you who sent in specific questions that you would like to have answered regarding district heating in Europe. Possibly some of those questions will be answered in this talk this morning. If not we propose to have the complete reports of our engineer summarized and that will be sent around to the district heating companies just as soon as we can make it available. We have a stack of reports and exhibits about a foot and one-half high and I must confess that I haven't been all through them yet but I have gotten enough out of them to bring something of interest to you to-day.

The object of this presentation is to bring to you as briefly and as clearly as we may a composite picture of what is going on in Europe in the field of district heating. I should like first to point out some of the outstanding differences between our practices in this country and some of those found to be more or less common practices in European plants. Then I shall read from the summaries of reports of a number of installations, such information as will give you a broad idea of the size and character of these plants and, following this, will show a group of slides bringing out details of construction. After that, if there is time, I will answer the questions. Otherwise we will ask the reporter to make a note of them and I will see that all questions are answered so far as we can and have the answers distributed in the form of a tabulation of questions and answers.

In reviewing the vast amount of information secured by our engineer, I was particularly impressed with certain rather outstanding differences between what we generally regard as sound and desirable practices and what in many cases are followed by European plants.

In the first place, the character of ownership is frequently very different, although in the majority of cases the heating business is carried on and tied in with the electric service. I can't go into that now, but we will be glad to discuss the matter of ownership with any that might be interested during the Convention.

Another feature is the common use of hot water as the medium of heat transmission. Very frequently, both high and low-pressure steam and hot water are distributed by the same company. This will be brought out in the summary.

The methods of charging for service, while similar to our own in many cases, also disclose differences. The most noteworthy difference is the use of a hot water meter which, by recording the incoming and out-

going temperature and the flow of water, indicates the actual heat delivered to the customer. That meter is made in Europe and quite extensively used on plants employing hot water.

In the matter of design, we find some wide variations. The pipe used, for example, is generally steel but of a much lighter weight than we use for similar pressures. Welding is employed to even a greater extent than is common here, both the gas and electric methods being used.

The use of return lines is more common than it is with us, where we find that the advantage of the return system can scarcely be justified after considering its cost and maintenance.

The various types of pipe installations well known to us are practically unknown, or at least very little used in Europe. Apparently, each plant has carried on independent investigations of available insulating materials. For the most part, it seems to me that we have a much higher development of insulations than they have; although one of their developments is rather revolutionary. It has demonstrated over a period of years remarkable efficiency, affects substantial cost reductions, and promises to prove quite worth while and is being employed in an increasing number of installations. This is an inflated or porous concrete insulation of which we secured a number of rather good photographs. These will be shown in the slides.

Where conduits are used—and sometimes they are not—they are usually of concrete; although they appear to be coming to some type of insulated conduit, it is yet in the development stages. Like ourselves, they are giving great emphasis to the security and permanency of anchorage. The expansion and contraction of their lines is accommodated by several methods. Cumbersome pipe bends and very costly expansion chambers are not uncommon. Very large outside diameter corrugated steel pipe sections are being used in one or two installations.

A patented flexible joint is widely employed which acts in multiple like a pipe bend and requires a very large chamber, but provides a much greater degree of flexibility than either a plain or a corrugated bend. The slides will show these and how they are installed. Slip-joints, of course, are quite freely used.

Another thing that is interesting is their rather extensive use of accumulators. I will show these in the slides. Several of the plants there have one or two and, in some cases, batteries of accumulators to carry their peak. In the customers' premises they are rather elaborate,

more elaborate than we are, and they assume generally a large degree of responsibility for maintenance of customer equipment.

Now, I would like to go into the details of some of these plants. I am going to ask the reporter to not record these details because they were not secured to be published. I don't know that there is anything in them that is extremely confidential, but I would prefer that they be left out. . . .

Mr. Slade then submitted a great deal of detail concerning the various European district heating plants visited by their engineer, indicating the sizes of pipe used, the number of feet installed, the number of customers, the various kinds of equipment and materials used, and specific information concerning construction and operating details.

During the evening session an interesting group of lantern slides was shown and a number of questions were answered having to do with construction and operating practices of the European plant.